

## Nutrition



**Chelated trace elements premium product**

## Spray Rates



**Moisture makes a big difference to herbicide rates**

## Quality control



**4Farmers strengthens production & quality control**

# PROSULFOCARB – PROVING TO BE A WINNER IN RYEGRASS CONTROL

**T**he first year of the new 4Farmers Prosulfocarb herbicide has provided excellent results for farmers using it to control Ryegrass.

Prosulfocarb is an important tool for every farmer fighting to control Ryegrass because it is a group K chemical - different to group D Trifluralin. This means the combination of both chemicals in the same season on Ryegrass is good resistance management strategy.

4Farmers trials this year are exploring future uses for Prosulfocarb PSPE (post seeding pre emergent) and EPE (early post emergence) which are currently not on the label.

Incorporation before sowing (IBS) treatment of prosulfocarb and trifluralin can be most convenient. This offers the advantage of getting control into paddocks before the possibility of wet, boggy conditions occurring.

PSPE or EPE treatments of Prosulfocarb, on the other hand, have generally given better weed control than IBS in trials so far. It could be that a split application strategy - some pre and some post sowing, will be the ultimate way for optimising control.

### BEVERLEY TRIAL

A trial site at Beverley (WA), had high ryegrass numbers (324 plants/m<sup>2</sup>). Conditions were wet at sowing and continued to be wet since. There was no stubble cover and the conditions were about as good as you could hope for in controlling ryegrass at these high ryegrass densities with Trifluralin alone. Prosulfocarb and Trifluralin applied IBS improved control. However, the level of ryegrass control was improved even further by applying the Prosulfocarb PSPE or EPE. In both these cases, the improved ryegrass control was partly due to better ryegrass control in the furrows.

CONTINUED P3...



**Murray Francis - highly impressed with how well Prosulfocarb helped control Ryegrass in the crop behind him and compares it to an untreated spray miss which is like a lawn of Ryegrass.**

### Murray Francis (Kulin WA), was faced with a bad problem paddock of Ryegrass this season

He finds Ryegrass an especially tough challenge on one 92ha paddock that has very gravelly soil.

An application two years ago of 1.5L/ha Trifluralin achieved very poor results. Last year it had another bad result, when with Lupins he used 0.5L/ha Clethodim.

"I knew going back to wheat I would be struggling against Ryegrass," he said.

"So I tried 2.5L/ha of 4Farmers Prosulfocarb + 1.5L/ha Trifluralin IBS and I have been amazed how good the results were. I've never seen it so clean".

"I was even more impressed as moisture was pretty marginal at sowing on 15th May and the next decent rain after that was 20th June."

Murray said that where the Ryegrass was not as bad in another paddock, he cut the application back to 1.5L/ha Prosulfocarb. The result was OK but not as good.

On badly infested paddocks he thinks he will keep the rates up to at least 2.5L/ha plus Trifluralin IBS. And maybe, a second treatment early post if the trials prove it effective.

**Special offer**

**Discounted price on Prosulfocarb is available now!**

See back page for more details

# 4Farmers Products

with cross reference to similar trade name products

## Herbicides

2,4-D Amine 625, 750  
2,4-D Ester 680  
2,4-D Ester 800 (RP\*)  
2,4-D plus Picloram  
Amitrole 250  
Atrazine 600, 900  
Bromacil  
Bromox MA  
Bromoxynil 200  
Brown Out  
Carfentrazone 240  
Chlorsulfuron 750  
Clethodim 240  
Clodinafop 240  
Clopyralid 300, 750  
Cyanazine 900  
Dicamba  
Diclofop-Methyl 500  
Diflufenican 500  
Diflufenican/Bromoxynil  
Diuron 900  
Fluazifop 212  
Flumetsulam 800  
Fluroxypyr 200  
Glufosinate-Ammonium 200  
Glyphosate 470,450,540  
Glyphosate 875  
Haloxifop 520  
Ipic 240  
Imazethapyr 700  
I-PYR 750  
LV MCPA 570  
LVE MCPA/ Diflufenican  
MCPA 750  
Metolachlor 960  
s-Metolachlor 960  
Metribuzin 750  
Metsulfuron Methyl 600  
Oryzalin 500  
Oxyfluorfen 240  
Paraquat 250  
Pendimethalin 330  
Propyzamide 500  
Prosulfocarb 800  
Quizalofop-p-ethyl  
Simazine 900  
Sulfometuron 750  
Sulfosulfuron 750  
Terbuthylazine 750  
Terbutryn  
Tralkoxydim 400  
Tri-allate 500  
Triasulfuron 750  
Tribenuron Methyl 750  
Triclopyr 600  
Trifluralin 480  
Tri-pick  
Turf Control

## Similar Product

Amicide 625°  
Estericide Xtra 680°  
Various  
Tordon™ 75-D  
Amitrole T°  
Gesaprim°  
Uragran°  
Bromicide MA °  
Bromicide 200°  
Spray.Seed°  
Hammer°  
Glean°  
Select°  
Topik°  
Lontrel°  
Bladex°  
Dicer 500°  
Hoegrass°  
Brodal°  
Jaguar°  
Various  
Fusilade°  
Broadstrike°  
Starane™  
Basta°  
Roundup°  
Roundup Dry°  
Verdict°  
Flame°  
Spinnaker°  
Arsenal°  
LVE Agritone °  
Tigrex°  
Agritone°  
Dual°  
Dual Gold°  
Lexone°, Sencor°  
Ally°  
Surflan°  
Goal°, Striker°  
Gramoxone°  
Stomp°, Argo°  
Kerb°, Edge°  
Arcade°, part Boxer Gold°  
Targa°  
Gesatop°  
Oust°  
Monza°  
Terbyne 750°  
Igran°  
Achieve°  
Avadex °  
Logran °  
Express°  
Garlon°  
Treflan°  
Grazon°  
Spearhead°

70%  
formulated in  
Australia  
by 4Farmers

## Seed Dressings

Imidacloprid 600  
Imid-Triadimenol  
Iprodione 500  
Procymidone 500  
Tebuconazole 25T  
Triadimenol liquid/WP150  
Triticonazole 200

## Similar Product

Gaucho°, Emerge°  
Zorro°  
Rovral°  
Sumislex °  
Raxil°  
Baytan C°  
Real°

## Fungicides

Azoxystrobin 500  
Azoxycypro (RP\*)  
Carbendazim 500  
Chlorothaloril 720  
Epoconazole 125  
Flutriafol 500  
Iprodione 500  
Mancozeb 750  
Procymidone 500  
Propiconazole 500  
Tebuconazole 430  
Triadimefon 125  
Triadimefon 500 Dry  
Triadimenol 250

## Similar Product

Amistar WG °  
Amistar Xtra°  
Bavistin°, Spin°  
Bravo°  
Opus 125°  
Impact°, Intake°  
Iprodione Aquaflo°  
Penncozeb 750 DF°  
Sumislex °  
Tilt°, Throttle°  
Folicur°  
Triad°, Slingshot°  
Unique to 4Farmers  
Bayfidan°, Shavit°

## Insecticides

Alpha-Cyber 100, 250  
Aluminium Phosphide  
Fumigation Pellets  
Bifenthrin 100  
Chlorpyrifos 500  
Dimethoate 400  
Fenamiphos 400  
Fipronil 800  
Imidacloprid 200  
Lambda-Cyhalothrin 250  
Omethoate 290  
Pirimicarb 500

## Similar Product

Dominex°  
Phostoxin°  
Talstar°  
Lorsban°  
Rogor°  
Nemacur°  
Regal °  
Confidor°  
Karate Zeon °  
Le-mat°  
Aphidex°, Pirimor°

## Rodenticides

Zinc Phosphide Mouse Bait  
Strychnine Alkaloid Crystals  
1080 Vermin Baits

## Similar Product

MouseOff °

## Other Products

Ammonium Sulphate  
Boom Cleaner  
Citric Acid  
Farm Pro 700  
Foam marker  
Metaldehyde Snail/Slug Bait  
Penetrator  
Speedy Spray Adjuvant  
Sunshade Spray Adjuvant  
Turbo Charge  
Wetter 1000

## Similar Product

LI 700°

Pulse Penetrant°  
Hasten°  
AntiEvap°  
Supercharge°, Uptake°

## Trace Elements

Zn Chelate  
Cu Chelate  
Mn Chelate

\*RP – Registration pending

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# PROSULFOCARB – A WINNER IN RYEGRASS CONTROL

Trial Treatments	Beverley % Control	Narembeen % Control
Trifluralin 2L/ha IBS	84.2	80.7
Prosulfocarb 1L/ha IBS+ Trifluralin 2L/ha IBS	87.6	94.2
Prosulfocarb 2L/ha IBS+ Trifluralin 2L/ha IBS	91.4	96.1
Trifluralin 2L/ha IBS + Prosulfocarb 2L/ha PSPE	98.7	99.7
Trifluralin 2L/ha IBS+ Prosulfocarb 2L/ha EPE	99.2	88.1

## NAREMBEEN TRIAL

A trial with the same design as Beverley at Narembeen WA had very different conditions. At seeding there was a drying profile and no rain for 6 weeks after sowing. Ryegrass numbers were lower (26 plants/m<sup>2</sup>) and stubble loading was low.

The Trifluralin application worked quite well on its own - even after 6 weeks without rain, but the addition of Prosulfocarb gave a far more satisfactory control.

The Trifluralin 2L/ha IBS plus Prosulfocarb 2L/ha PSPE was the stand-out treatment with nearly complete ryegrass control. This was a little surprising as the Prosulfocarb sat on the surface before rain for 6 weeks.

The Prosulfocarb at 2L/ha EPE did not work as well as expected. This was probably due to dry conditions at spraying. Also, though the Prosulfocarb was applied when most of the Ryegrass was emerging 6 weeks after sowing, some ryegrass did come up earlier and these older plants were not controlled by the Prosulfocarb.

## EFFECT ON WILD RADISH

A surprising bonus in Prosulfocarb trials this year has been the consistent suppression of radish. Radish density has been lowered where Prosulfocarb was applied - IBS or PSPE. The plants that emerged were distorted and stunted.



Left: Radish following Prosulfocarb 2L/ha IBS Right: Untreated Radish

## Chelated Trace Elements – The premium choice

**F**oliar application of trace elements have become increasingly popular with farmers keen to maximise yields.

Chelation is a technical term to describe a type of bonding between metal ions and complex organic compounds.

4Farmers has been extremely pleased with how well its trial shipment of chelates have been received by farmers.

Chelates are considered superior to other forms of foliar applied trace elements - oxides and sulphates for the following reasons:

**Tank mix compatibility** - Chelates are highly soluble and non-reactive. These characteristics allow 4Farmers chelate products to better mix with a wide range of crop protection products. Sulphate products can more easily react with other chemicals in the tank solution, leading to clogging and reduced efficacy. Oxides are prone to precipitate, leading to blocked filters and jets.

**Crop safety** – Chelate trace element formulations offer a safe and efficient micronutrient delivery system. Because each nutrient is safely contained within a stable chelate molecule, plant tissue is protected from phyto-toxic reactions during



Greg Cavanagh with bags of trace elements

application. In contrast, sulphates flood leaf cuticles and tissue with high levels of nutrient salts known to cause leaf scorch.

**Efficient uptake and usage** - Typically, oxide trace element products range between 50% to 70% nutrient content, while sulphate products contain up to 30%. The 4Farmers chelates contain between 12% and 14%, but the translocation and uptake efficiency is vastly better.

Sulphates can result in inefficient use and cause tissue damage

Oxide translocation is dependent on particle size. Poor quality oxides may not contain enough fine particles to allow

sufficient and/or timely translocation to meet plant nutritional requirements.

Oxide products require substantially greater plant energy to metabolise the nutrient component, potentially resulting in as little as 50% of the nutrient being assimilated, while sulphate product assimilation can vary widely from 25% to over 60% depending on conditions.

Once inside the plant, chelated molecules mimic natural plant micronutrient uptake systems, therefore plant cells are readily able to access the protected nutrient where and when required, enabling almost 100% efficiency.

**Ease of Handling** – The chelates supplied by 4Farmers come as a fine powder that readily dissolves in solution. They are packed in convenient 25kg plastic heat sealed bags.

Quindanning WA grower Greg Cavanagh has been impressed. "I used each of the chelated products from 4Farmers, Copper, Zinc and Manganese, and they were great."

"They were easy to use in the bags and mixed well with all of the chemicals I used".

After a successful response this season 4Farmers will be bringing in a greater supply next season. Farmers are encouraged to order early.

# 4Farmers strengthens its chemical production and quality control management

**D**r. Roger Franklin, an original director of 4Farmers, and our first chemist, has recently returned to the 4Farmers fold as Production Manager and Senior Chemist.

Roger brings over 30 years of experience in industrial chemistry and has already made his mark by strengthening the 4Farmers senior management team that oversees quality control.

After graduating in the UK with a PhD in 1979, he migrated to Australia in the early eighties after doing post-doctoral research in the US.

Immediately on arrival, he took up roles in generic pesticide companies. The first was CIK (acquired by Nufarm while there), and later, as senior chemist at Davisons.

He has subsequently worked as a consultant for a range of industrial chemistry projects and in various business ventures. Activities included pesticide registrations, product development and processing with companies such as Nufarm, Genfarm, Joyce Rural, Rural West and United Farmers.

In addition to all that he was a director of 4Farmers from 1994 to 1996.

"I have fond memories of the early years at 4Farmers. I only left because I saw an opportunity for myself in the upstream processing that 4Farmers wasn't doing at that time. Not just in ag chem but a range of products," Roger explains.

In 1996 with a business partner, he established Quadron Manufacturing to undertake the toll blending of water and solvent

based pesticides, liquid fertilisers and chemicals for use in oil and gas production. Quadron ran successfully for 11 years but wound up in 2007 due to the GFC fallout and he returned to general consulting.

4Farmers coincidentally was starting its manufacturing operation at that time and bought all the Quadron lab equipment and a lot of the manufacturing gear.

## RETURN

Roger says he is looking at the activities of 4Farmers through fresh eyes.

Since starting in July he has begun a comprehensive review of all aspects of 4Farmers production operations; people, formulations and manufacturing processes.

He has looked at every aspect of the production process from pre-delivery to the warehouse through to dispatch, and has already introduced a number of changes to improve the processes.

One of Roger's earliest recommendations, which has been adopted, was to appoint a Laboratory Manager overseeing Quality Control.



Dr Roger Franklin with Dr Kim Dastlik in the 4Farmers laboratory.

This role is independent of the production process.

Dr. Kim Dastlik has been appointed as Laboratory Manager; with responsibility for quality control and Laboratory operation. The combination of Kim and Roger represent the strengthening of the senior management team for overseeing chemical production and quality control management at the 4Farmer's chemical processing and production factory.

## Moisture makes a big difference to herbicide effectiveness

**S**praying moisture stressed weeds can increase the required rate of Glyphosate by more than 10 times, compared to plants growing with adequate moisture.

Other factors that reduce efficacy are low relative humidity, and warmer temperatures between germination and spraying. These were the conclusions of GRDC funded research by Dave Minkey and John Moore in 1995.

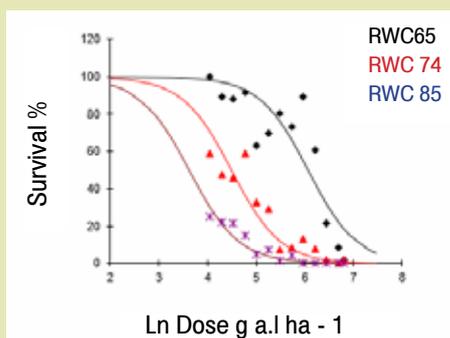
The study found over the range of conditions, to achieve 90% control with Glyphosate 450, the application rates could range from 150mL/ha to 3L/ha. A similar circumstance was also observed for a range of leaf uptake herbicides. The species of weed also make a significant difference to required rates to achieve sufficient kill with Glyphosate.

John Moore has since used this research to develop a computer software tool called HerbiRate that we featured in 4Front Spring 2016.

### 1. Moisture stress

ED90 (herbicide dose to kill 90% of the population) and ED50 for wheat sprayed with glyphosate for low, medium or high soil moisture treatments (gai/ha = grams of active ingredient/hectare).

Moisture treatent	Relative wheat leaf water content [%]	ED 90 (gai/ha)	ED 50 (gai/ha)
Low	65%	1292	431
Medium	74%	270	90
High	85%	114	38



Log scale dose response curves of glyphosate rates for wheat at three different levels of moisture stress. RWC = Relative Water Content (%) of wheat leaves.

Moisture stress increases chemical rates because;

- Plants develop a thick, waxy cuticle on their leaves that is a barrier to herbicide uptake. After a rain event, the weeds freshen up as they start to grow again, but the waxy cuticle remains, so even though rainfall helps, it doesn't completely undo the harm that has been done and these weeds will remain relatively hard to kill. If conditions improve and new leaves emerge with a normal, thin cuticle, the weeds can become more susceptible to a herbicide.
- Translocation is slow during moisture stress. Translocated herbicides struggle to reach their site of action.

# Product testing – Maintaining quality control over our products

**E**very batch of every product 4Farmers sells is sample tested, and a retained sample kept in our laboratory for independent quality control testing.

This includes products made in 4Farmers own factory, as well as imported fully-formulated products. 4Farmers tests its products in its own laboratory before the product is approved for dispatch, to ensure we are supplying our customers with the best quality products.

Should there be any query on any of our products, we can go back to the retained samples for more extensive testing in our laboratory.

## GOOD PRODUCTION PROCESS

Testing is an important part of our quality control process, but it remains only one part of the safety net that helps to identify any potential problems. The purpose of the lab is not just Quality Control but developing and maintaining best practice production processes.

This starts with a good formulation recipe.

The next is devising a good production process, so what works on the lab bench up-scales to larger production on the factory floor.

Good production processes allow us to identify potential problems early and mitigate those problems before they leave our factory. This is a continual process and requires

constant vigilance and strong, experienced management to oversee.

## PACKING - EXTRA TESTING

After formulating the product, it must then be packed into its final containers before being despatched.

Good packing processes ensure products are correctly formulated, the packing equipment, containers and lines are flushed clean and free of contaminants, and that they are packed into the correct containers and correctly labelled.

One of the recent innovations introduced to strengthen our QC process is that product sampling will now take place both before and after packing out. This extra sampling step will ensure farmers receive exactly what they order and puts an extra level of security into our process to pick up any potential errors before products leave our factory.

## MORE IMPROVEMENTS

Newly appointed Laboratory Manager, Dr Kim Dastlik has a PhD in Organic Chemistry from Murdoch University and has completed post-doctoral research work in the US.

He hails from a family farming background in Morawa, WA and has a wide range of senior chemistry and business experience to be an excellent appointment for strengthening the 4Farmers quality control process.

He says, "I come from a background in the

pharmaceutical industry where best practice demands outstanding quality control. I intend to bring this level of experience and expertise to 4Farmers and to ensure our processes are best practice for our industry."

"There is scope to improve our methods. We will also be making some updates in lab equipment, staff training and testing procedures."

"But the biggest improvements that Roger Franklin and I will be making will be on the production floor in our factory. Good quality control starts with good formulation processes, which means we should only be producing good products".



**Newly appointed Laboratory Manager, Dr Kim Dastlik amongst retained samples.**

## 2. Relative humidity

Two field sites in Newdegate and Katanning were sown to wheat and experienced almost identical growth, climatic conditions and relative water content of the wheat leaves at spraying. The only measurable difference was the relative humidity (RH) at spraying. The rate of glyphosate to kill wheat at Katanning with low RH was about 60% higher than the rate needed at Newdegate with high RH.

The conclusion was that low relative humidity at spraying reduces droplet survival on the leaf and reduces the amount of herbicide that the plant takes up.

Site	Relative Humidity	ED90 (gai/ha)
Katanning	30%	198
Newdegate	80%	121

## 3. Temperature

The mean degree days (average of max and min temperature) from germination to spraying was 11.9°C in 1995 and 16.2°C in 1996. This doubled the rate of glyphosate from approximately 0.5l/ha to over 1/ha required to kill 90% of the ryegrass population (ED90).

## 4. Plant species

This research also investigated the rate of glyphosate required to control different plant species. Bear in mind this was pre glyphosate resistance. In simple terms, ryegrass was about twice as hard to kill with glyphosate as wheat.

Species	ED90 (gai/ha)
Wheat	294
Canola	358
Capeweed	447
Annual ryegrass	618

## Conclusion

Be aware of just how big an effect moisture stress and seasonal conditions can have on herbicide efficacy. Use tools like HerbiRate to help calculate optimal rates in your situation.

Ideally, spray weeds after a rain while they are fresh. Otherwise after that, it is about compromises and managing the situation the best you can.

Spraying during high relative humidity helps, but it only helps a little compared to spraying after rain.

Acknowledgement; UWA, AHRI Newsletter 85, June 2017

<http://ahri.uwa.edu.au/why-thirsty-weeds-are-hard-to-kill/>

[www.herbiguide.com.au](http://www.herbiguide.com.au)



# Tank Mixing Guide



## STEP 1. WATER

Fill the spray tank to at least 70% of the total amount of water required and start agitation.

## STEP 2. WATER CONDITIONERS (including Sulphate Trace Elements)

## STEP 3. WETTABLE POWDERS (WP) (including Chelate Trace Elements)

## STEP 4. WETTABLE GRANULES/WATER DISPERSABLE GRANULES/DRYFLOWABLES (WG/WDG/DF)

Allow a minimum of 10 minutes to achieve a uniform suspension.

## STEP 5. SUSPENSION CONCENTRATES/FLOWABLES (SC) (including Oxide Trace Elements)

## STEP 6. EMULSIFIABLE CONCENTRATES (EC)

After EC's top the spray tank up to almost its maximum capacity

## STEP 7. WATER SOLUBLE GRANULES (SG) E.g. Glyphosate 875

## STEP 8. SOLUBLE LIQUID PESTICIDES (SL) E.g. Glyphosate 450/470/540

## STEP 9. FLEXI-N AND OTHER LIQUID NUTRIENTS

## Step 10. ADJUVANTS E.g. Wetter 1000 Wetters should be added before oils at this step.



## New mixing sticker a handy reminder

**A** reminder for spray operators of the correct mixing order can be worthwhile.

A few simple steps and a bit of care can avoid a disaster.

In the Autumn 2016 edition of 4Front, an article was published on correct mixing orders. 4Farmers has since further refined these instructions into a large A4 sticker which is illustrated.

If you would like to have one of these stickers at absolutely no cost, they'll be available at our field day displays, or you can obtain them from your local distributor.



## Discounted price on Prosulfocarb

### is available now!

Talk to Travis, Jacinta or a 4Farmers distributor now to book discount Prosulfocarb for next year!

Collect and pay for your Prosulfocarb needs before 20th January 2018 and we guarantee the lowest list price between now and the end of April next year.

**Offer is limited!  
CALL NOW!**

# “I saved \$20,000 on my chemicals. I should have called 4Farmers years ago”



This is a quote from a new 4Farmers client last year.

He was one of many farmers who discovered that they can get top quality, Australian-made chemicals delivered to their farm, direct from the supplier, at the best price.

Just one phone call is needed.

Put your business first and call 4Farmers to place your order and discover how easy it is

**Head Office 1800 038 445  
www.4farmers.com.au**

